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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,570	03/31/2004	Teng-Wang Huang	MAIKP131US	6882

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EXAMINER

DEO, DUY VU NGUYEN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 10/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/814,570

Applicant(s)

HUANG ET AL.

Examiner

Duy-Vu N. Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                            |                                                                                         |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                           | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art and in view of Chen et al. (US 6,468,362).

Admitted prior art teaches a wet etching method of a substrate to form deep trench for a DRAM cell comprising: etching the substrate in a first HF tank (claimed vessel); rinsing substrate in second tank; etching the substrate in a third NH<sub>4</sub>OH tank; rinsing the substrate in a fourth tank; and drying the substrate (pages 1-2 of the specification). Unlike claimed invention, admitted prior art doesn't describe the first rinsing agent comprising at least one wetting agent. Chen describes a method for cleaning the substrate wherein the cleaning solution comprises of a surfactant (claimed rinsing comprising wetting agent) (col. 2, line 65-67; col. 7, line 7-20). It would have been obvious for one skilled in the art to modify admitted prior art in light of Chen by using a cleaning solution with a surfactant because Chen teaches that it would clean the substrate with minimal water marks and residues (col. 1, line 47-57; col. 10, line 31-36). Admitted prior art teaches of successively performing these etching and rinsing steps before the drying step (page 1, line 35-39). Therefore, the combine prior art above would perform the second etching while the wafer is still wet with the rinsing solution with the surfactant.

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Referring to claims 6, 17, Chen describes the wetting agent concentration is 0.01-0.1% by V (claimed 0.01-0.1% by wt).

Referring to claims 7, 9, 18, 19, 20, admitted prior art describes the deep trench has aspect ratio of 50 or more are possible (page 1, line 30-35).

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification in page 5, line 5-12, 18-20, doesn't describe or teach *performing a second etching step after the first rinsing step while the at least one substrate is wet with the first rinsing agent containing the at least one wetting agent nor while the substrate is wet with the first rinsing agent comprising the at least one wetting agent, arranging the substrate in a third vessel containing a second etchant*. It only describes the effect of the wetting agent on the etching step but nothing about how these steps are carried out as claimed. Lines 18-20 describes that the wetting agent forms a part of the etching process, which can be anything including modifying the wafer surface. This still doesn't teach anything about the wafer is wet or

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not wet with rinsing solution with the wetting agent when performing the second etching or moving the wafer into the third vessel containing the second etchant as claimed.

***Response to Arguments***

5. Applicant's argument that Chen teaches of rinsing the wafer with water and then drying the wafer is acknowledged. However, in another embodiment he teaches of rinsing with the solution that having surfactant and stopping before the surfactant is completely removed (fig. 1). Therefore, he does suggest keeping the surfactant on the wafer. Furthermore, Chen teaches a series of steps only for a cleaning process including drying the wafer, which would be more likely at the end of the whole process of manufacturing the wafer as described by admitted prior art above. Admitted prior art describes, during a process of manufacturing a wafer, series of steps are carried successively including etching and rinsing before drying the wafer. In this case, the wafer would still have the rinsing solution with the wetting agent when moving to or performing the next etching step.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duy-Vu N. Deo whose telephone number is 571-272-1462. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Duy-Vu N Deo  
Primary Examiner  
Art Unit 1765

10/25/06

